

## Solving Radical Equations

### The Principle of Powers (pg. 470):

A radical equation is an equation in which the variable appears in a radicand. Examples are

$$\sqrt[3]{2x+1}=5$$

$$\sqrt{a-2}=7$$

$$4-\sqrt{3x+1}=\sqrt{6-x}$$

To solve such equations, we use the principle of powers rule.

If both sides of an equation are raised to the same power, all solutions of the original equation are among the solutions of the new equation.

In other words: *If  $a=b$  then  $a^n=b^n$*  for any exponent  $n$ .

### Example:

$$\sqrt{x}-3=4$$

$$\sqrt{x}+5=3$$

Raising both sides of an equation to an even power may not produce an equivalent equation. In this case, a check is essential.

### To Solve a Radical Equation (pg. 471):

1. Isolate one radical term on one side of the equation.
2. Raise each side of the equation to a power equal to the index of the radical and simplify.
3. If the equation still contains a radical term, repeat steps 1 and 2. If not solve the equation.
4. Check all proposed solutions in the original equation.

### Examples:

$$x=\sqrt{x+7}+5$$

$$(2x+1)^{\frac{1}{3}}+5=0$$

$$\sqrt{2x-5}=1+\sqrt{x-3}$$

Let  $f(x)=\sqrt{x+5}-\sqrt{x-7}$  find all  $x$ -values for which  $f(x)=2$